

The Canadian Entomologist.

VOL. XXXVIII.

LONDON, OCTOBER, 1906.

No. 10

THREE NEW CANADIAN FLEAS

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1. *Chaetopsylla setosus*, sp. nov.—Nearest to *Ch. ursi*, Rothsch. (1902), but easily recognized by the shape of the abdominal sclerites and the tarsi.

Head.—The labial palpus consists of about ten segments, reaching beyond the trochanter, while in *ursi* there are seven or eight segments only. There is one row of four or five bristles before the eye. The occiput bears two or three hairs behind the base of the antenna, a lateral row of four or five bristles in the centre, and a subapical row.

Thorax.—There is one row of bristles on the pronotum, besides one or two hairs situated on the back. The epimerum of the metathorax is strongly produced backwards, rather more so than in *Ch. trichosa*, Koh. (1903), and bears a posterior row of from six to nine bristles, besides about ten smaller ones, which are arranged in two irregular rows.

Abdomen.—The tergites of the first seven segments bear each two rows of bristles, there being some additional hairs in front of these rows on the first three tergites. The anterior row is incomplete on the posterior tergites. On the second tergite there are about eight, on the third about six bristles placed beneath the stigma, while there are in this position two bristles on segments four to seven, the last bristle of the postmedian row being likewise situated below the stigma (Fig. 41).

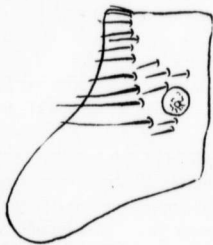


FIG. 41.



FIG. 42.

The first sternite has some lateral bristles, while the sternites of segments three to seven bear each a row of three or four bristles, and from

seven to ten smaller ones. All the dorsal and ventral sclerites of segments one to seven are small and (in extended specimens only?) widely separated. The hinder edge of the sternites is slanting, the upper hinder angle projecting backwards. The seventh sternite is sinuate (Fig. 42).

Legs.—The arrangement of the bristles is of the type usually found in this genus. The hind tibia bears six dorsal pairs of bristles. One of the apical bristles of the second hind tarsal segment reaches to the middle of the fifth segment, while the longest apical bristle of the fourth hind tarsal segment extends nearly to the claw. The bristles on the ventral surface of the mid and hind tarsi are numerous. The fifth segment is as slender as in *Ch. trichosa*, being much slenderer than in *Ch. ursi*. It bears ventrally a subbasal hair. The proportional length of the tarsal segments is as follows:

Mid tarsus	25	23	16	12	28	
Hind tarsus	46	28	18	14	28	

We have two females of this species, one from Eagle River, Sicamous, Canada, 1st Sept., 1903, collected from *Canis latrans* by Mr. G. F. Dippie, and another from Mabel Lake, British Columbia, 6th May, 1902, taken from *Ursus americanus* by Mr. Allan Brooks.

Length, 3.5 mm.

2. *Ctenopsyllus selenis*, spec., nov.—Close to *Ctenopsyllus hesperomys*, Baker (1904), which we know only from the description, the ♀ alone being described by Baker.

Head.—The three upper bristles of the frontal row are spine-like, being short and stout, while the other bristles of this series are slender, gradually tapering to a fine point. There are two genal spines, as in *Ct. hesperomys*.

Thorax.—The pronotum bears a comb of 26 spines. The mesonotum is one-fourth longer than the metanotum in the ♀, while these two tergites are nearly equal in length in the ♂. In *hesperomys* the mesonotum is said to be twice the length of the metanotum (♀). The number of hairs on the metathoracal epimerum is slightly variable, there being usually 3, 3, 1 in the ♂, and one or two more in the ♀.

Abdomen.—The tergites bear, like the metanotum, some short teeth at the apex, being, moreover, minutely serrated. The numbers of these

teeth are on the two sides together in the ♂ 6, 6 or 7, 5 or 6, 4 to 6, 2 to 4, 2, and in the ♀ 4 to 6, 6 to 8, 5 or 6, 2 to 6, 0 or 2, 0. The sternites of segments 4 to 6 bear in ♀ on each side a row of four bristles, the sternite of the seventh segment a row of seven or eight bristles, there being in the ♂ three bristles on the sternites of segments 3 to 7. At the apex of the seventh tergite there are three bristles in both sexes, the first and third being in the ♂ rather shorter, but somewhat thicker than the lower bristles of the postmedian row, while in the ♀ the third bristle attains nearly the length of the central one, the upper bristle being as short as in the ♂. The stylus of the ♀ is about two and one-half times as long as it is basally broad.

Legs.—There are on the outer side of the hind femur two bristles behind the ventral subbasal sinus, one bristle above the sinus and a small subventral one further back; posteriorly at the apex there are two subventral bristles on the outer side and one on the inner.

The proportional length of the mid and hind tarsal segments is as follows:

Mid tarsus, ♂	17	12	9	6	11
“ ♀	18	14	9	6	11
Hind tarsus, ♂	29	17	11	7	11
“ ♀	33	19	13	8	11

Modified Segments.—♂. The eighth sternite is rounded truncate at apex, bearing a number of long bristles (Fig. 43, VIII st). The manubrium (M) is acuminate and slender. The process (P) of the clasper reaches to the apex of the finger, its tip being rounded. The finger (F) has the shape of a half crescent, the distal (= ventral) edge being almost regularly rounded, bearing three long and some short bristles. The ninth sternite bears five long bristles and a number of small hairs (IX st). ♀.—The seventh sternite bears a small sinus. On the eighth tergite there are three or

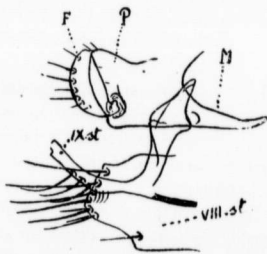


FIG. 43.

four small hairs above the stigma and one long bristle, and one or two small hairs below the stigma. At and near the apical and ventral margins of this tergite there are seven to eleven long bristles and four to six smaller ones proximally of the long ones, the apical edge bearing besides three long and four short bristles.

Length: ♂, 1.3 mm.; ♀, 2 mm.

The following is a list of the specimens we have in our collection:

1 ♂.—Horse Creek, Upper Columbia Valley, Canada, 13th Oct., 1903, *Peromyscus canadiani*, G. F. Dippie.

1 ♂.—Horse Creek, Upper Columbia Valley, Canada, 14th Feb., 1901, *Microtus Drummondii*, G. F. Dippie.

1 ♂.—Blackfalds, Alberta, Canada, 11th Aug., 1904, Kangaroo mouse, A. D. Gregson.

2 ♀.—Kicking Horse Canyon, British Columbia, 6th Oct., 1903, *Evotomys gapperi*, G. F. Dippie.

3 ♀.—Red Deer, Alberta, Canada, 4th Aug., 1901, *Evotomys gapperi*, G. F. Dippie.

3. *Ctenopsyllus hamifer*, spec. nov.—This species bears, like the preceding species and *Ct. hesperomys*, Baker (1904), a genal ctenidium of two spines. The insect agrees very closely with *Ct. selenis*, except in the genitalia.

Head.—Only the upper two bristles of the frontal row are short and spine-like.

Thorax.—The metathoracical epimerum bears nine bristles, 4, 4, 1.

Abdomen.—The abdominal sternites of segments 4 to 6 bear on each side a

row of four bristles, while the seventh segment has a row of five.

Modified Segments.—♂. The eighth sternite (Fig. 44, VIII st.) is apically produced downward, bearing at some distance from the apical edge four long bristles. The manubrium (M) is rather broader than in *Ct. selenis*. The clasper is longer and the finger (F) larger and quite

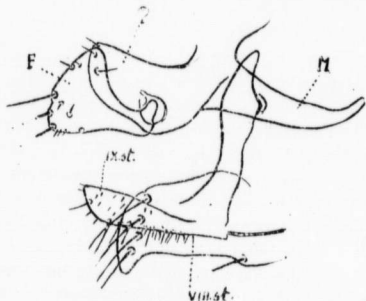


FIG. 44.

different in shape. The finger bears three long bristles, one standing at the ventral corner and two above it; they are broken in our only specimen. The ninth sternite (IX st.) is also very different from that of *C. selenis*, being much broader. It bears three bristles at the ventral edge, and many small hairs, as shown in the figure.

Length, 2 mm.

We have one ♂ taken off *Mustela* sp. at Blackfalds, Alberta, Canada, on the 10th Jan., 1901, by Mr. A. D. Gregson.

NOTES ON THE YOUNG LARVÆ OF SOME SPECIES OF PULVINARIA.

BY GEORGE B. KING, LAWRENCE, MASS.

Shortly before the destruction of my laboratory in 1903, I began to study some of the young females of several species of *Coccide*, for the purpose of determining if there were any constant structural characters present that would enable one to identify the adult female scale, and if there were any characters that could be used to separate closely-allied forms, also what characters could be used in the classification of the several genera. In the following species of *Pulvinaria* all are light yellow in colour, elongate oval; the marginal hairs are alike, the anal lobes do not project beyond their body; six bristles to the anal ring, and six jointed antennæ, all very much alike, the first usually short, with the third and sixth longest. The larvæ studied were dead, dry examples, hatched in confinement, and may have been in some instances of a different colour than yellow, but turned so after long standing.

Pulvinaria Tinsleyi, King, 1900.—Unfortunately, but one poor example was found. The antennæ showed 6 joints: (1) 16, (2) 16, (3) 32, (4) 16, (5) 20, (6) 40.

Pulvinaria occidentalis, Ckll., 1894.—Boiled in potash, very dark brown, internal juice removed colourless, 460 long, 270 broad. Legs: coxa 36, femur + trochanter 64, tibia 52, tarsus 40, rostral loop stout, 160 long; bristles of the anal ring 40 long. Anal lobes with one long bristle and two short simple spines 12 long. Antennal joints: (1) 20, (2) 16, (3) 36, (4) 20, (5) 24, (6) 28; the hairs on the several joints are quite long.

Pulvinaria Cockerelli, King, 1899.—Length, 136; breadth, 200. Antennal joints: (1) 20, (2) 12, (3) 32, (4) 16, (5) 20, (6) 32. Leg:

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coxa 20, femur + trochanter 48, tibia 44, tarsus 24 long. Bristles of anal wing 28 long. Anal lobes have one long bristle and two short spines. Rostral loop short, 120 long.

Pulvinaria amygdali, Ckll., 1896.—Treated with potash, light yellow brown; internal juice removed colourless, 400 long, 180 broad. Segments of the antennæ: (1) 20, (2) 16, (3) 24, (4) 16, (5) 16, (6) 28 long. Front leg: coxa 32, femur + trochanter 48, tibia 32, tarsus 28 long. Rostral loop short, 140 long. Anal lobe with one long bristle and two short spines.

Pulvinaria Ehrhorni, King, 1901.—Larva 520 long, 260 broad. Antennal joints: (1) 16, (2) 20, (3) 32, (4) 20, (5) 20, (6) 40 long. Bristles of anal lobe 340 long, the two spines 20 long. Rostral loop very stout, 240 long. Front leg: coxa 24, femur + trochanter 60, tarsus 52, tibia 44 long.

Pulvinaria viburni, King, 1901.—Body 520 long, 240 broad. Antennal joints: (1) 20, (2) 16, (3) 28, (4) 16, (5) 20, (6) 40. Front leg: coxa 28, femur + trochanter 72, tibia 68, tarsus 28 long. Hairs of anal ring 48 long, those of the anal tubercule 342 long, spines 20 long, rostral loop 188 long. All the above measurements are in micromillimeters.

AN ALASKAN MOSQUITO.

BY C. S. LUDLOW,

Laboratory of the Office of the Surgeon-General, U. S. Army, Washington, D.C.

Among some mosquitoes lately sent from Alaska is a species which, coming from the far north (65° N.), has the unique position of standing near three mosquitoes found in much warmer climates, *i. e.*, *Theobaldia annulata*, Shrank, found in Europe, Mexico and California, an Italian species of which Falbici says, "Fin ora fu trovata solamente a Macarese ed a Pato," and *penetrans*, R. Desvoidy, found in France.

Theobaldia Alaskænsis, n. sp.—Female.—Head dark brown, covered with white curved scales, and dark brown forked scales on the occiput, with flat white scales on the sides, and extending down under the labium; a few brown bristles around and between the eyes; antennæ dark brown, heavy white pubescence and sparse brown verticils, first and second joints with some white flat scales, basal joint testaceous, with a few white flat scales on the median side;

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palpi dark brown, sparsely covered with white flat scales and a few hairs ; proboscis yellowish from base about two-thirds its length, the apical third dark brown, the whole sparsely covered with thin white flat scales ; the effect of the proboscis under the hand lens is not, however, of a band, the proximal part being merely of golden brown tinge, and the distal part darker ; clypeus brown ; eyes dark blue-green.

Thorax dark brown ; prothoracic lobes with a few white curved scales ; mesonotum sparsely clothed with rather large white curved scales, and some brown bristles, which do not, however, form any ornamentation except for two tiny faint white submedian spots nearly midway of the mesothorax, which only show in rather perfect specimens ; when denuded there is a suggestion of a dark median line ; pleura dark brown, with white flat spatulate scales ; scutellum dark brown, the white curved scales being grouped distinctly on the lobes, the interlobular part naked ; eight long brown marginal bristles on mid and six on the side lobes, a few lighter bristles above ; metanotum brown.

Abdomen dark brown, with dark brown scales and white bands, mostly basal, but sometimes very slightly apical, and in some specimens develop into very narrow lateral spots, especially on the distal segments ; occasional white scales scattered through the brown ; second segment with a narrow median line, apical almost wholly white scaled ; apices and sides of segments rather profusely supplied with light-coloured hairs ; venter mostly white scaled.

Legs : Coxæ and trochanters all brown, with white scales ; femora dorsally brown, scaled with a sprinkling of white scales, ventrally white, a small light apical spot, but no ring as in *annulata* ; tibiæ and metatarsi also brown, sprinkled with white, with small light apices ; first and second tarsal joints in all the legs with narrow basal light (ochraceous) spots not always amounting to bands ; remainder of tarsi brown, except on the hind legs, where sometimes the base of 3rd and 4th joints have a few white scales, not noticeable with a hand-lens ; ungues large, simple and equal.

Wings brown ; costa, subcosta and first long veins heavily scaled with long truncate scales, mostly brown, but sprinkled with a few white scales ; these are also found on the stem of the fifth ; the second, third, fourth and sixth veins clothed with long, slender, brown scales ; lateral scales narrowly lanceolate, median truncate but slender, aggregated so as

to form four small but distinct spots, occurring at the root of the second, the bases of the fork cells, and at junction of cross veins; first submarginal cell about one-third longer and a trifle narrower than second posterior, both stems about one-half the length of the latter; cross-veins nearly of one length, and almost in a line; ventral scales long and slender; halteres, light stem, dark knobs.

Male.—Much as female; antennæ give banded appearance; verticels light brown; palpi as long or longer than proboscis, dark brown, with a light band at base of apical joint, plumes brown except at the light band, where they are yellowish; very marked contraction at the distal end of the second abdominal segment, giving a "wasp waist" effect; legs as in female, but the bands distinct and fairly wide, especially on the hind legs, where there is a narrow band on the third tarsal; in the fore and mid legs this joint has only a suggestion of a band; fourth joint brown; ungues large, unequal in fore and mid legs, the larger biserrate and the smaller uniserrate, in hind legs large, simple and equal.

Length, 10-11 mm. Habitat, Fort Egbert, Alaska. Taken May-June.

Type, No. 9959, U. S. N. M.

Described from five females and one male sent me by 1st Lieut. J. R. Bosley, Asst. Surg. U. S. Army, in two collections from Fort Egbert, Alaska.

It is closely related to both *annulata*, Shrank, *Falbici*, No., and *penetrans*, Desvoidy. Differs from the former in that it has only the tiny spot on the thorax; there is no band on the female palpus, and only one on the male; there is no ring on the femur, and the leg bands are much narrower and ochraceous rather than white.

It differs from *Falbici* also in the thoracic marking; the palpi are only white scaled; the median stripe on the second abdominal segment; the tarsal bands are basal only, and the mid ungues of the male have only one tooth on the smaller. It apparently reverses the colouring of *penetrans*, and has only four "maculis plus minusve distinctis."

It is possibly not out of place to state here that the specimens from San Francisco, Cal., which otherwise agree well with Theobald's description of *T. annulata*, Shrank, lack the mid band on the metatarsi, and that three, and sometimes even four, tarsal joints are minutely banded.

A FEW NEW COCCIDÆ, WITH NOTES.

BY EDW. M. EHRHORN, SAN FRANCISCO, CAL.

Orthezia Californica, sp. n.—Female about $4\frac{1}{2}$ mm. long, $3\frac{1}{2}$ mm. broad, and 2 mm. high. Body flat, very firm, and covered with thick lamellæ of a light brown colour. Margin beset with broad wax lamellæ, which grow larger caudad, ending in two, which form a shield-like process. There are three shield-like lamellæ on the anterior part of the dorsum; caudad of these is a deep carina, formed by two rows of lamellæ running parallel and ending at the caudal shield-like process. Antennæ and legs dark brown, beak quite stout. Female measures with egg-sac 5 mm. Egg-sac about as broad as long, and is square at caudal end, covering entire ventral abdomen. Colour white, formed of bands of white wax closely attached to each other. The caudal ends are of a light brown colour. Body of female after boiling in K. O. H. remains light brown, antennæ, legs and mouth-parts dark brown. Derm is covered with innumerable blunt, tube-like spinnerets. Antennæ 8-jointed, each joint with several short, stout spines. Joint 8 ends in an elongated glassy process. Joint 1 longest, joints 2 and 3 subequal and next in length, joints 6 and 7 subequal and shortest. Formula: 1 (2, 8), 3, 4, 5 (6, 7).

Measurements of antennal joints in μ : 1, 320; 2, 280; 3, 160; 4, 145; 5, 140; 6, 120; 7, 120; 8, 280. Legs very long and stout, with several rows of short, stout spines running longitudinally. Femur about twice as long as tarsus. Tibia with two stout spines. Claw slightly curved, with two stout spines. Measurements of middle leg in μ : Coxa, 300; trochanter and femur, 1,000; tibia, 740; tarsus, 440; claw, 120. Anal ring large, with 6 long stout hairs, about 260μ . Eggs lemon-yellow. Young larva covered with a dense white secretion, colour of body orange-yellow. Antennæ and legs light brown. Antennæ of 6 joints. Joint 6 longest, nearly twice as long as 2. Joints 3 and 5 equal, joint 4 shortest. Formula: 6, 1, 2 (3, 5), 4. Measurements in μ : 1, 100; 2, 80; 3, 60; 4, 40; 5, 60; 6, 150.

Habitat.—On *Bahia* sp., Mayfield, Santa Clara Co., California.

Kermes Rattani, sp. n.—Adult female globose, from 5 to 6 mm. in diameter, varying a little according to position on twig. Surface smooth, not shiny, nor hardly pubescent, sometimes waxy. Colour light brown, generally with four white stripes running parallel with segmentation. When seen through lens these stripes have numerous brown dots at

intervals. Derm, after boiling in K. O. H., becomes colourless, with numerous round gland-orifices and small brown dots. Antennæ 6-jointed, indistinctly segmented, joint 3 apparently longest.

Larva reddish-purple, slightly covered with secretion. Derm, after boiling in K. O. H., colourless. Legs and antennæ and caudal tubercles yellowish-brown. Antennæ 6-jointed. Joint 3 longest, joint 4 shortest, joints 2 and 5 subequal. Formula approximately 3, 6, 1 (2, 5), 4. Body elongate oval, about twice as long as broad. Margin with short, stout spines. Caudal tubercles rounded and very prominent, with three stout spines. Caudal setæ long and stout. Legs short and stout. Tibia two-thirds of tarsus. Tarsus one-quarter shorter than femur. Claw long and slender, slightly curved. Digitules long, fine, knobbed hairs. Anal ring with six long stout hairs, reaching to end of tubercle.

Male sac of snow-white felt, elongate oval, convex above, about $1\frac{1}{2}$ mm. long and $\frac{1}{2}$ mm. broad; sometimes flakes of yellow wax are found on sac.

Male is very small, abdomen dark red, thorax and head black, wings iridescent. Stile well developed. Antennæ 10-jointed, joints sausage-shaped, very hairy. Joint 1 shortest and stoutest, joints 5, 6, 7 longest and subequal. Formula: (5, 6, 7), 2, 4, 8, 9, 10, 3, 1.

Legs long and slender. Femur stout, shorter than tibia. Tibia with stout spines. Tarsus about half of tibia. Claw long and slender, and well curved. Digitules fine hairs.

Hab.—On *Quercus chrysolepia*, Stevens Creek Canyon, Mountain View, California. Named in honour of my friend, Prof. Volney Rattan, of San Jose, Cal., for whose kind assistance in botany I am under great obligation.

Eriococcus bahie, sp. n.—Adult female enclosed in a closely-felted sac, the exterior of which is cream coloured, the interior snow-white. Sac about 3 mm. long and $1\frac{1}{2}$ mm. broad, convex above, more or less flattened below. Eggs reddish-purple.

Body of female tapering, plump, shiny, about $2\frac{1}{2}$ mm. long and 1 mm. broad. Segmentation distinct. Colour dark crimson-purple. Legs and antennæ light brown. Margin with short white filaments. When boiled in K. O. H., derm is colourless, antennæ, legs and mouth-parts remaining light brown. Margin with a row of stout conical spines. Dorsal surface covered with small stout spines. Antennæ 7-jointed, quite hairy. Joint 3 longest, joints 2, 5, 6 subequal and shortest. Formula: 3, 4 (1, 7), (2, 5, 6).

The following variations have also been observed :

3, 4 (1, 7), 2, 5, 6.

4, 3, 7 (1, 2), 5, 6.

3, 4 (1, 7), 2 (5, 6).

The measurements of joints in μ are as follows : Joints 1, 36-40 ; 2, 32-36 ; 3, 60 ; 4, 52-64 ; 5, 24-28 ; 6, 20-24 ; 7, 40-42. Legs long and slender, each segment with several long bristles. Coxa very stout, 80μ long by 112μ broad. Femur and tarsus subequal. Tibia shorter than tarsus. Claw stout and curved. The measurements in μ are : Coxa, 50 ; trochanter plus femur, 200 ; tibia, 136 ; tarsus, 148 ; claw, 24. Anal ring large, with 8 stout hairs (100μ). Young larva crimson-purple, very active. Antennæ and legs light brown, antennæ of 6 joints. Joint 3 very much the longest. Formula : 3, 6, 1, 2 (4, 5). The measurements of joints in μ are : Joints 1, 16-28 ; 2, 16-20 ; 3, 36-40 ; 4, 16-20 ; 5, 16 ; 6, 27-28.

Caudal tubercles well developed, with long bristle (180μ) and several stout spines. Margin beset with very stout spines.

Habitat.—On the roots of *Bahia* sp., Stevens Creek Canyon, Mountain View, California.

Eriococcus Howardi, sp. n.—Female enclosed in a snow-white, closely-felted sac, about $3\frac{1}{2}$ to 4 mm. long and 2 mm. broad, tapering, quite convex above, not carinated. Body of female when dry very much shrivelled, colour reddish-brown. When boiling in K. O. H., gives off a dark crimson colour. Derm colourless, with innumerable stout, slightly curved spines of various lengths. Legs and antennæ light brown. Mounted specimens measure about 2 mm. long and $1\frac{1}{2}$ mm. broad. Antennæ 8-jointed, each joint with several hairs. Joint 3 longest, sometimes subequal with joint 8. Joints 6 and 7 subequal. Formulæ :

3, 8 (1, 2), (4, 5, 7), 6.

3 (2, 8), 1, 4, 5, 6, 7.

(3, 8), (1, 2), (4, 5), 6, 7.

Measurements of joints in μ are as follows : 1, 40 ; 2, 40-48 ; 3, 48-52 ; 4, 28-36 ; 5, 28-32 ; 6, 20-28 ; 7, 24-36 ; 8, 48. Each antenna is equal in length to tibia + tarsus + claw. Legs moderately short and stout. The measurements in μ are : Coxa, 192 ; trochanter, 60 ; femur, 200 ; tibia, 200 ; tarsus, 96 ; claw, 40. Digitules of tarsus long fine knobbed hairs, those of claw short fine knobbed hairs. Anal ring

ordinary, with 8 long hairs (170μ). Caudal lobes very stout and long (100μ by 80μ broad), cone-shaped, with long stout setæ about 180μ , and several stout spines.

This species resembles *E. borealis*, Ckll., in having 8-jointed antennæ, but differs in other respects very much from it. Named in honour of Dr. L. O. Howard, Entomologist of the Dept. of Agriculture, Washington, D. C.

Habitat.—On *Quercus* sp., Calaveras Valley, Santa Clara Co., Cal.

Eriococcus Catalinae, sp. n.—Adult female enclosed in a snow-white sac in masses among the fine leaves of the plant, about $3\frac{1}{2}$ mm. long and $1\frac{1}{2}$ mm. broad. Colour of body dark purple, legs and antennæ light brown. When boiled in K. O. H. liquid turns purple and body becomes transparent. Derm covered with numerous spear-head-shaped spines and many round glands. Anal ring large, with 6 long hairs. Caudal lobes inconspicuous, setæ long. Antennæ 7-jointed, joint 7 longest, rounded at tip, with numerous hairs, joint 1 next in length, other joints vary considerably, as the following formulæ will show. Formulæ :

7, 1 (2, 4), 6, 3, 5.

7, 1, 2 (4, 6), 5, 3.

7 (1, 2), 4 (3, 5, 6).

7, 1 (2, 6), (3, 4, 5).

Measurements of antennal joints in μ are: 1, 40; 2, 28-40; 3, 24; 4, 24-36; 5, 20-28; 6, 24-32; 7, 60-68. One specimen with 6-jointed antennæ measured as follows: 1, 40; 2, 32; 3, 48; 4, 28; 5, 32; 6, 68.

Legs short and stout like *Ripersia*. Coxa, 80μ ; trochanter plus femur, 152μ ; tibia, 80μ ; tarsus, 52μ ; claw, 20μ . Tarsal digitules 36μ long fine hairs, those of claw much shorter.

This species is very closely allied to *E. artemisiae*, Kuw., but is a smaller species, differs in the antennæ, and does not infest the root and trunk of the plant.

Habitat.—On *Artemisia* sp., Catalina Island, Cal.

I also found *Saissetia oleæ*, Bern., on *Rhus integrifolia*, small specimens about $2\frac{1}{2}$ mm. long by $2\frac{1}{2}$ mm. broad, not very convex. Antennæ averaging this formula: ♂, 3 (2, 4), 5, 1 (6, 7).* *Aspidiotus rapax*, Comst., was also found on the same plant and other shrubs.

Phenacoccus Colemani, sp. n.—Adult female salmon pink, thinly covered with mealy secretion about $2\frac{1}{2}$ mm. long and $1\frac{1}{2}$ mm. broad. Segmentation distinct. Legs and antennæ light brown, eyes black. Female with

egg-sac about $5\frac{1}{2}$ mm. long. Sac loosely woven of greenish-tinged cotton, not dense enough to hide the lemon coloured eggs. Larvæ orange-yellow.

Female, when boiled in K. O. H., derm first turns reddish-brown, then becomes colourless. Antennæ and legs light brown. Antennæ 9-jointed, joint 9 longest, joint 1 and 5 subequal, joints 4, 6, 7, 8 shortest and subequal. Formula: 9, 2, 3 (1, 5), (4, 6, 7, 8). Each joint with several slender hairs. Joint 9 always the longest, and joints 7 and 8 always the shortest; the other joints sometimes vary a little, and the following formulæ may assist in determining:

- 9, 2, 3 (1, 5), 4 (6, 7, 8).
 9 (2, 3), (1, 5, 6), (4, 7, 8).
 9, 2 (1, 3, 5), (4, 6), (7, 8).
 (9, 2), 3 (1, 5), 4 (6, 7, 8).
 (9, 2), (1, 3, 5), (4, 6), (7, 8).
 (9, 2), 3 (1, 4, 5), (6, 7, 8).

Legs long and stout, with numerous hairs. Coxa quite stout, with long stout bristle, about half as long as tibia. Tibia a little longer than femur. Tarsus about half as long as femur. Claw long and slender, slightly curved, with small denticle. Digitules of tarsus long fine hairs, those of claw club-shaped hairs.

Habitat.—On stems and leaves of *Rubus* sp., on Pescadero road, south of Palo Alto., California, June 5, 1900.

Pseudococcus juniperi, sp. n.—Adult female oval, about 2 mm. long and 1 mm. broad, convex, slightly covered with secretion. Egg-sac small. Young larvæ reddish. Adult female, when boiled in K. O. H., turns dark crimson. Derm colourless, with numerous short, straight spines on the dorsum. Antennæ 8-jointed. Joint 8 longest, joint 1 and 7 subequal. Joints 4, 5 and 6 about equal and shortest. Formula: 8, 3, 2 (1, 7), (4, 5, 6), also 8, 3, 2, 7, 1 (4, 5, 6). Legs long and slender. Femur and tibia about equal. Tarsus about half of tibia. Tarsal digitules fine knobbed hairs. Claw small, slender and curved, with curved, club-like digitules reaching to end of claw. Measurements of leg joints in μ : Coxa, 96; trochanter, 48; femur, 192; tibia, 192; tarsus, 95; claw, 24. Caudal lobes rounding, with one very long, stout bristle ($200-212\mu$) and three short, stout spines on the outer and one on the inner margin. Each lobe has numerous round gland orifices. Anal ring large, oval, about 80 by 60μ , with six long hairs about 220μ .

Habitat.—On *Juniperus virginiana*, Ashforks, Arizona.

Ripersiella Kelloggi, Ehrh. and Ckll., sp. n.—Proc. Biolog. Society of Washington, Vol. 14, Aug. 9, 1901. Adult female generally attached to the roots of grass, producing a small quantity of white cottony secretion, which generally incases the body. Colour creamy-white, about $1\frac{1}{2}$ mm. long and 1 mm. broad, oval, sometimes pyriform, shiny. Segmentation not very distinct. When placed in K. O. H. derm turns yellow, but becomes transparent, so that it is difficult to find it on the slide. Antennæ very close together, about 15μ , 5-jointed, quite hairy. Joint 5 longest, longer than $2+3+4$, which are subequal. Formula: 5, 1 (2, 3, 4). Legs very short and stout. Femur very stout, about as long as tibia plus tarsus. Tibia about as long as tarsus, with two stout bristles, about 8μ . Tarsus with stout bristle. Claw long and slender. Digitules fine hairs. Caudal tubercles inconspicuous, with short fine bristles. Anal ring very small, with six short fine hairs.

Habitat.—On the roots of *Bunch grass*. Stevens Creek, Mountain View, Cal.

In the Proceedings of the Biolog. Soc. of Washington, Aug. 9, 1901, Mr. Cockerell says: "This species was found by Mr. Ehrhorn on the roots of *Bunch grass* at Mountain View, Cal., in December, 1898, but no description has yet been published. It is easily recognized by the characters mentioned above. The length of the last antennal joint is about 30μ . The mouth-parts are ordinary, the labium not elongated."

This species was sent to Prof. Tinsley, when he established the new genus *Ripersiella*, and I had expected him to describe it, but after a long silence my slides and notes were returned to me. In the above description I have added a few more important characters, which will aid in the determination.

Pulvinaria pluchee, sp. n.—Female scales dark brown, about as broad as long, varying from 3 to 4 mm. Ovisac snow-white, ribbed longitudinally and varying in shape and length, according to position on twig, from 3 mm. broad to 5 or 7 mm. long. After boiling in K. O. H. derm is colourless. Marginal spines straight, slender and sharp, and hard to detect on slide. Anal plates heart-shaped, with three slender spines at tip and two bristles on outer margin. Anal ring with long stout hairs. Antennæ with a few slender hairs, quite stout and 8-jointed. The

average sequence of joints is as follows: Joint 3 longest, 2 and 4 subequal, next 1, sometimes 1 and 5 subequal, next 8, joints 6 and 7 shortest, sometimes subequal. Formula: 3 (24) 15867. Joints measure in μ : 1-48, 2-60, 3-72, 4-60, 5-44, 6-28-32, 7-28-30, 8-4c. Legs short and stout. Measurements of middle leg in μ : Coxa, 30-35; femur with trochanter, 85; tibia, 60; tarsus, 33; claw, 12. Digitules club-shaped, extending beyond claws. Hairs and spines of this species are few and are very short and fine.

Habitat.—At San Diego, Cal., on *Pluchea sericea*. It covers the twigs quite thickly. A Chalcid fly attacks the female when the cottony sac is forming, but does not seem to materially check the scale.

NEW SPECIES OF PERLIDÆ.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

In looking over my collection preparatory to a rearrangement of the forms, I find several new species, that I describe below. One of them represents an interesting new genus, allied to *Nemoura*. I have added illustrations of the genital structures, as these are of considerable value in the determination of the species. I hope soon to be able to prepare a revision of our species of this family, one of the most primitive of existing winged insects.

Acroncuria pumila, n. sp.—Head uniformly yellowish, without marks; antennæ and pronotum duller yellowish; thorax and abdomen more brownish; legs yellowish; setæ pale yellow. Wings hyaline, venation yellowish. The ocelli form a triangle a little shorter than equilateral, posterior ccelli very much closer to each other than to eyes; pronotum narrowed behind, very rugose above on each side, the smooth median space much wider behind than elsewhere. Wings only a little longer than the abdomen; many cross-veins in apical region, but not in submarginal space; many costal cross-veins, and five or six beyond the end of subcosta; six to eight cross-veins in both cubital and median series. Ventral plate of female much more produced than in any described form.

Length, 17 mm. One female from Three Rivers, California (Baker). It is the smallest species of the genus in our country, but it is probable that other specimens will be larger, as these forms are variable in size.

Perla luctuosa, n. sp.—Head rather orange-yellow, a large black spot covering ocelli, a transverse dark spot on clypeus, posterior angles of head

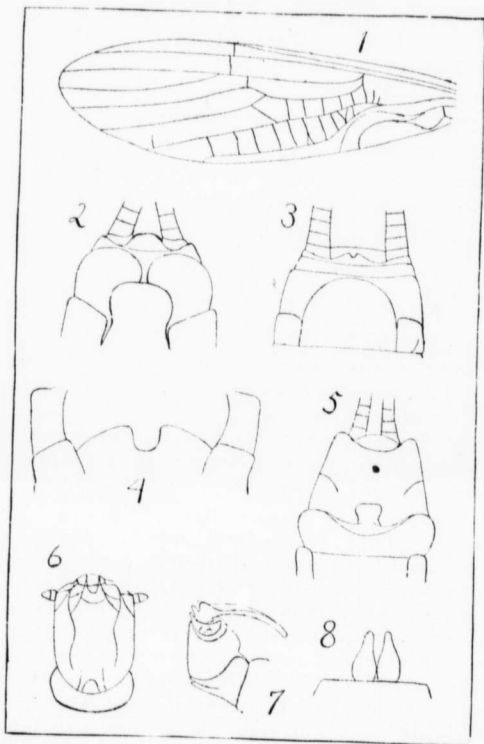


FIG. 45—

1. *Perlomyia collaris*, fore wing.
2. *Isoperla longiseta*, ventral plate.
3. *Acroneuria pumila*, ventral plate.
4. *Perla luctuosa*, ventral plate.
5. *Isoperla sordida*, ventral plate.
- 6, 7, 8. Genitalia of *Leuctra grandis*.

behind the eyes black ; basal part of antennæ yellowish, beyond the sixth joint blackish ; pronotum orange-yellow, a broad black mark each side, but leaving the margins pale ; thorax and abdomen blackish, margins of ventral segments and the last segment yellow ; setæ yellowish, tip darker ; legs yellowish, darker above on base of tibiæ, and the tarsi dark ; wings distinctly yellowish, venation blackish, base of radius and median yellowish. Head rather broad, eyes not very large, ocelli small, the triangle broader than long, posterior ocelli nearer to eyes than to each other ; pronotum short, slightly narrowed behind, sides straight, corners sharp, not very rugose above. Fore wings with two cross-veins beyond the end of the subcosta, about eight cross-veins in both median and cubital series, three branches to radial sector beyond anastomosis, in both specimens there is a closed cell just beyond anastomosis, between radial sector and median vein.

Expanse, 34 mm. Two specimens from San Francisco, Cal.

Isoperla sordida, n. sp.—Dull yellowish, an indistinct V-mark connecting the ocelli ; a broad dark mark each side on the pronotum ; antennæ brownish on apical half ; tips of tarsi brownish ; wings flavescent, with entirely pale yellowish venation. Head rather broad, ocelli form equilateral triangle, the posterior ocelli about as close to the eyes as to each other ; pronotum as broad behind as in front, sides barely convex, quite rugose above ; setæ short, not as long as the abdomen, the joints short. Wings quite long, about three cross-veins beyond subcosta, several costal cross-veins, radial sector forked once about one-third to one-half way out ; about six cross-veins in cubital and median series, radial sector arising fully or e-half way to anastomosis.

Expanse, 24 mm. One specimen from Los Angeles, California (Hutchinson).

Isoperla longiseta, n. sp.—Dull yellowish ; ocelli connected by black V-mark ; antennæ dark beyond middle ; pronotum with faint dark mark each side, extreme margins pale ; lobes of thorax brown ; abdomen yellow-brown ; setæ yellowish, darker on tips ; tips of tarsi dark ; hind tibiæ with a faint dark mark above near base ; wings hyaline, yellowish on costal margin, venation pale, rather darker in middle and apical parts. Ocelli form an equilateral triangle, the posterior ocelli a trifle nearer to eyes than to each other ; pronotum only a little narrower behind than in

front, sides straight, corners acute; setæ very long, much longer than abdomen, joints long. Wings rather large, almost acute at tip, one cross-vein beyond subcosta, radial sector almost geniculate at origin, almost one-half way to the anastomosis, forked once about one-third way out, four or five cross-veins in median and cubital series.

Expanse, 17 mm. Two specimens from Onaga, Kansas (Crevecoeur).

PERLOMYIA, n. gen.—No anal setæ; second joint of tarsi much shorter than others; no oblique cross-veins from radius beyond end of subcosta; radial sector furcate shortly beyond cross-vein; third apical cell narrowed at base; cubital series of cross-veins extending much beyond median series; radial sector and median vein arise from the radius at the same point; hind wings with large, folded anal space; and the radial sector, median vein and cubitus all arise from the arculus.

Perlomyia collaris, n. sp.—Black, antennæ and apical joints of the legs more brown; wings smoky, venation brown. Pronotum plainly longer than broad, its corners rounded, above it is rugulose each side. Wings long, not rolled; one basal costal cross-vein, no others; the median cell is narrowed at tip and closed before end of discal cell; all apical cells very long; about seven cross-veins in median series, and one or two before the arculus; about 10 or 11 cross-veins in cubital series, three or four beyond last of median series. In hind wings there are only two or three median and cubital cross-veins, and the radial sector is forked just beyond the cell.

Expanse, 23 mm. One specimen from Wellington, Brit. Col. (Taylor).

Leuctra grandis, n. sp.—Head and pronotum dark brown, clothed with short fine hair; antennæ black, basal joints paler; thorax yellow-brown; abdomen dark brown; legs yellowish; wings fumose, venation brown. Ocelli small, posterior ocelli fully three times as close to eyes as to each other; third joint of antennæ plainly longer than fourth. Wings rather long; fore wings with about six cross-veins in median series, and eleven or twelve in the cubital series; in the hind wings the fork of the radial sector has a pedicel as long as the width of a cell, and is a little farther basad than the fork of the cubitus.

Length, 10 mm. Several specimens from Black Mts., N. Car. (Beutenmüller), June. This is our largest species of the genus.

NEW RHYNCHOPHORA.

BY CHAS. SCHAEFFER, MUSEUM OF THE BROOKLYN INSTITUTE,
BROOKLYN, N. Y.

Conotrachelus tuberculicollis, new species. — Form and size of *juglandis*, but thorax distinctly tuberculate, colour more uniform grayish, and the post-median fascia on elytra indistinct. Head densely covered with ochreous and white scale-like hairs; eyes separated by about the width of the beak; the beak slender, separated from the head by a slight transverse impression, about as long as head and thorax and slightly curved, distinctly tricarinate to about apical third, where it is closely punctate; from base to about middle the surface is sparsely clothed with pale scale-like hairs; antennæ inserted about apical third, first joint of funicle slightly stouter than the second, but of nearly equal length. Thorax as long as broad, sides slightly bisinuate to a little before middle, then abruptly narrowing to apex; surface rather uneven, with coarse punctures and four rather prominent tubercles, of which two are placed at apical margin and two more widely separated at middle of disk, between which the surface is convex; the vestiture consists of ochreous and white scale-like hairs, the white forming at sides a more or less distinct line from base to the median tubercles. Elytra sinuate at sides a little below the oblique humeri, then narrowing to apex; punctures large and broadly confluent on the disk; third interval with three elevated crests, of which the middle is the largest, fifth interval with two tubercles, one near base and a larger before middle, behind middle a costiform elevation not reaching to apex, seventh interval elevated, but feebly interrupted below the humeral callus, surface and crests densely clothed with appressed yellowish-gray and grayish-white scale-like hairs, the pale hairs more condensed at the humeri and behind the median crests. Body beneath with stout yellow hairs; mesosternum narrow between the coxæ, feebly impressed in front; all the femora with an obtuse tooth and small denticle, tarsal claw strongly toothed. Length, 6 mm.

Huachuca Mts., Arizona.

This species, best placed in Leconte's division, I-A, resembles *juglandis* in form, size and elytral crests, but differs from it, as well as from any known North America *Conotrachelus*, by the strongly tuberculate thorax. Of all the described Mexican species with tuberculate thorax, it is perhaps nearest *nodulosus*, but *tuberculicollis* has no decumbent setæ,

the seventh interval is not abruptly interrupted, the ventral segments are not sparsely and finely punctured, and the beak is rather slender, and not "exceedingly stout" as in that species.

Conotrachelus Arizonicus, new species. — In form and general coloration resembling *leucophæatus*, but thorax not as coarsely punctured, and without crests in front, the costæ on elytra feeble and nearly obsolete on the disk, but prominent at apex, the upper surface with short semi-erect setæ. Head densely punctate, clothed with ochreous hairs, eyes separated by the width of the beak, the latter feebly curved and moderately stout, strongly convex at base, tricarinate, the intervals between the carinæ rugose, at apex moderately coarsely punctate; antennæ inserted at slightly less than apical third. Thorax broader than long; sides nearly straight and parallel to a little before middle, then strongly narrowing to apex and feebly constricted; surface coarsely punctate, very sparsely clothed on the disk with ochreous and at sides with white hairs, which are inclined forward. Elytra very feebly sinuate below the humeri, the latter rounded; surface with rows of large, closely-placed punctures; alternate intervals feebly elevated on the disk and at sides; at apex the third has two moderately prominent crests, and the fifth and seventh are distinctly elevated; colour brown, with pale brown, white and yellow hairs, the latter more condensed on the second and third interval at base, the white forming a broad, irregular, oblique fascia from the humerus to nearly the middle of suture, the rest more irregularly and sparsely intermixed with white; surface with short, semi-erect pale setæ. Body beneath sparsely clothed with pale hairs, and very coarsely punctate; mesosternum nearly flat, not impressed in front; legs sparsely pubescent, slightly denser on the broadest part of hind femora, femora with one moderate tooth and one feeble tubercle, claws with a small tooth. Length, 4 mm.

• Arizona, one specimen in collection Dietz.

This species is to be placed near *nivosus* in Dr. Leconte's table, from which the closely punctured and very sparsely pubescent thorax, the slightly longer beak, the distinct elytral crests and the pale setæ on elytra will separate it.

Conotrachelus ecarinatus, new species.—Brown, elytra clothed very sparsely with pale and ochreous hairs, the latter forming an indistinct band behind middle, costæ almost obliterated, thorax without carina. Head closely punctate, and with short yellowish-white hairs, feebly transversely

impressed between the eyes; beak slightly longer than the head and thorax, and feebly curved, tricarinate, at apex rather closely punctate, punctures elongate at sides, and larger than at middle; antennæ inserted at about apical fourth. Thorax slightly broader than long; sides nearly straight to slightly before middle, then narrowing to apex, where the impression is feeble; surface with large closely-placed punctures, which are confluent at apex, not carinate, very sparsely clothed with short, forwardly-inclining, decumbent yellowish hairs. Elytra with rows of large punctures, alternate intervals feebly convex; surface with recumbent dark setæ, and very sparsely clothed with white and ochreous hairs, the latter forming an indistinct post-median fascia. Body beneath sparsely pubescent; mesosternum flat, truncate in front, abdomen coarsely punctate, punctures of last segment smaller. Legs slightly annulated, femora with two moderate teeth; claws finely toothed. Length, 4 mm.

Huachuca Mts., Arizona.

There is no sinuation at the sides of the elytra below the humeri, and the sides of elytra are more parallel to slightly behind middle than in any other species of Division I-A of Leconte, where this species has to be placed. This group contains those species which have the claws divergent, toothed, not cleft, prothorax not sulcate, femora bidentate, and elytral costæ interrupted. The three species described above all belong to this group, and to facilitate their identification the following table is presented. Our *anaglypticus*, which occurs in Mexico also, has two crests in front of thorax, and the surface between these impressed, but specimens occur without crest and impression. A few of the species in the following table are not represented in the material before me, and the characters employed had to be taken from the descriptions.

- | | |
|--|---------------------------------|
| 1. Costæ of elytra abruptly interrupted | 2. |
| Costa of elytra feebly interrupted | 5. |
| 2. Thorax strongly tuberculate | <i>tuberculicollis</i> , n. sp. |
| Thorax without tubercles | 3. |
| 3. Post-median elytral fascia uniformly white or pale yellow | 4. |
| Post-median elytral fascia white and yellow; the two post-median elytral crests near suture much larger than the others | <i>nenuphar</i> , Hbst. |
| 4. The two post-median elytral crests near suture large, more elevated than the others; elytra with a pale-yellow fascia behind middle | <i>juglandis</i> , Lec. |

- The interrupted elytral costæ equal, not forming elevated crests ;
 elytral fascia pale yellow or white *albicinctus*, Lec.
5. Prothorax with small median callus *retentus*, Say.
 Prothorax carinate or not 6.
6. Prothorax more or less distinctly carinate 7.
 Prothorax not carinate 11.
7. Ventral segments coarsely and closely punctate 8.
 Second, third and fourth ventral segments finely
 and sparsely punctured *affinis*, Boh.
8. Upper surface with short erect setæ; femora with two acute spiniform
 teeth *compositus*, Casey.
 Upper surface without erect setæ 9.
9. Thorax distinctly carinate from tip nearly to base; hind femora
 with a large acute tooth and a small denticle *seniculus*, Lec.
 Thoracic carina feeble; hind femora with two small denticles . . 10.
10. All the ventral segments closely and rather coarsely punctate, last
 ventral without tubercles *elegans*, Say.
 First and second ventral segments very coarsely, not densely, punctured;
 fifth finely and more densely punctate, with two distinct tubercles
aratus, Germ.
11. Thorax coarsely punctate, punctures not closely placed, but well
 separated, and never confluent; elytral costæ almost obsolete on
 the disk, but visible at apex *nivosus*, Lec.
 Thorax coarsely and densely punctate, punctures more or less
 confluent near apex 12.
12. Front femora with a moderate tooth and a small denticle, coloured
 like *leucophaeatus*, but the thoracic white lines indistinct, and the
 elytra with pale, semi-erect setæ *Arizonicus*, n. sp.
 Front femora with two rather prominent teeth, of which the one
 nearest the apex is slightly smaller than the inner; dark-coloured,
 elytra with a more or less distinct post-median yellowish band and
 short recumbent black setæ *ecarinatus*, n. sp.

Conotrachelus Texanus, new species.—In form and colour resembling a small *fissunguis*, but thorax and elytra with short bristles. Head clothed with white scale-like hairs; beak scarcely as long as head and thorax, feebly curved, trisulcate on each side, apex sparsely punctate on the disk, at sides with a few larger punctures. Thorax shining, slightly

broader than long, sides very feebly narrowing to a little before middle, then more strongly narrowing to apex, scarcely impressed, surface with large, closely placed punctures, which are confluent at apex, very sparsely clothed with short, stiff bristles. Elytra not impressed laterally below the humeri, which are rounded; punctures large and closely placed; intervals feebly convex; surface clothed with white and pale-yellowish hairs, not forming a fascia or band, with some erect, pale, short bristles intermixed. Body beneath and legs sparsely pubescent; mesosternum flat, feebly rounded in front; abdomen coarsely and closely punctate; femora with a moderate tooth; claws cleft, the inner portions touching each other. Length, 3.5 mm.

Brownsville, Texas.

By the cleft claws and erect setæ, this species has to be associated with *erinaceus*, *echinatus* and *hispidus*. From *echinatus* the toothed femora and the short bristles of thorax and elytra will separate it, and from the other two the shorter setæ of the upper surface, the more closely punctate abdominal segments, the stouter and larger form, and the distinctly carinate beak.

Cryptorhynchus lacteicollis, Champ.—Oblong oval; elytra blackish-brown, with sparsely placed yellowish scales, and with a number of reddish, shining tubercles; thorax uneven, densely clothed with white scales, on each side of middle of base two distinct darker spots. Head coarsely and closely punctate, with closely placed ochreous and white scales; front deeply impressed, between the eyes flat and carinate, above each eye a tuberculiform elevation; beak stout, feebly arcuate, rather coarsely and confluent punctured, finer towards apex; antennæ inserted at about middle of beak, funicle seven-jointed, with the first stouter and shorter than second, club elongate-oval, one-jointed, as long as the preceding five joints, finely pubescent. Thorax twice as wide as long, sides feebly narrowing from base to a little before middle, then strongly narrowing to the distinct subapical constriction; surface uneven in apical half, on each side of the median carina, the latter starting from the subapical impression to middle, and from here to base is a feeble impressed line; on each side two more or less distinct tubercles, one at about apical third and one at about basal third; apical margin at sides feebly emarginate, ocular lobes therefore feeble; base bisinuate, the feeble

basal lobe truncate at apex; surface very densely clothed with white scales, slightly less densely around the apical irregularities; on each side of median line is a darker spot of larger size, and near the basal angles on each side a smaller one. Elytra with irregular placed, not deeply impressed, punctures, and some reddish tuberculiform elevations; surface uneven, clothed with blackish-brown and pale-yellow small scales; near base at about middle, between the two median tubercles and near each of the two subapical tubercles, is a velvety-black spot of variable size, each surrounded by yellow scales. Abdomen alutaceous, sparsely punctate, with broader white and narrower, elongate, yellowish scales; mesosternum broadly and deeply excavated; anterior femora with an obliquely truncate-emarginate, moderately broad tooth, middle and hind femora with an obtuse tooth; tibiae shorter than the femora, tarsal claws simple. Length, 6-7 mm.

Palmerlee, Cochise Co., Arizona.

A small number of this fine species was taken by beating mistletoe growing on walnut, and was first discovered by Mr. H. G. Barber.

After sending in the above description of this species, Vol. IV., pt. 4, pp. 601-729 of the "Bialogia" was received, in which on p. 650 the species was described from a single specimen from Taxpam, Vera Cruz, Mexico.

The Mexican specimen is said to have two teeth on the anterior femora, while the Arizona specimens have the tooth obliquely emarginate truncate. The emargination of the tooth is very likely very strong in the Mexican specimen, giving the appearance of "a conspicuous additional tooth on the outer edge of the larger one."

The suture between the first and second ventral segments is more or less arcuate, which makes the second segment, especially at middle, longer than the third or fourth, but this is not in all specimens so well pronounced. In some of our species, placed in *Cryptorhynchus*, the first suture is not exactly straight as required, but it seems, from the variation observed in this respect, that not much stress can be laid on this character.

The form is more elongate than any of the North American species. This, together with the peculiar coloration and sculpture, makes it easily recognizable.

ON DR. WM. DIETZ'S REVISION OF THE TINEIDÆ
(HEINEMANN).

BY AUGUST BUSCK, WASHINGTON, D. C.

The long-expected paper by Dr. Wm Dietz, entitled: "Revision of the Tineid Subfamilies, *Amydriinae* and *Tineinae*, inhabiting North America,"¹ appeared during the writer's absence in Europe, and a subsequent summer's expedition to the West Indies made it impossible to give this important contribution to the knowledge of our American Tineidæ the attention it deserved before early this year. Since then I have gone carefully over all Dr. Dietz's material with him in his hospitable home in Hazelton, Pa., and have had another fruitful sojourn with him in my own home, which has resulted in complete agreement between us on nearly every point of difference in opinion which had arisen during my studies of his paper. Thus I am very gratified that the following corrections of that paper (with a few minor exceptions specially noted) are all seconded by Dr. Dietz, who has shown during our sometimes quite animated discussion a rare scientific spirit in the effort to get at the true facts, regardless of his expressed opinions, which cannot be too highly commended; in fact, Dr Dietz might as well have published the following notes himself, but has preferred that I should do it.

Dr. Dietz deserves very much credit for his painstaking work, which is one of the largest and most important single contributions ever published on our American Microlepidoptera, and which deals with one of the most difficult groups.

When in the following remarks I mainly give attention to the mistakes in the paper, it is not for lack of appreciation of the good work done or of the many difficulties conquered; but the mistakes should, of course, be corrected; these arise mainly from the lack of sufficient material, and are quite excusable, considering Dr. Dietz's disadvantages in working away from the type collections, and without an adequate library.

One very serious drawback to the paper, which Dr. Dietz cannot be held responsible for, is the fearful amount of typographical errors, worse than in any scientific paper I have met with, which cause much annoyance in study, and result in several unintentional additions to the synonymy.

Dr. Dietz's paper covers a group of moths, which may be shortly defined by our popular name for the paper, "Tinea and allies," and which is equivalent to Heinemann's old family *Tineidæ*; but the limits are rather

1. Trans. Amer. Ent. Soc. Phil., XXXI, pp. 1-95, 1905.

October, 1906.

arbitrarily drawn, as, for example, by the exclusion of the genera *Prodoxus* and *Tegeticula*, which naturally belong to this group.

Dr. Dietz divides these insects into two subfamilies: the *Amydriinae* and the *Tineinae*; it would, in my opinion, have proved more rational and profitable to have carried through Lord Walsingham's suggested three divisions of the group: *Setomorphinae*, *Euplacaminae* and *Tineinae*,² and I believe these groups will eventually stand; but there is at least a question of the propriety of substituting the new name *Amydriinae* for Lord Walsingham's name, instead of enlarging the conception of the already established subfamily so as to include *Amydria*.

Dr. Dietz says: "These two subfamilies are distinct and sharply defined," but not one nor any combination of the characters given by him hold good; on the contrary, the differences given in the synoptic table are very vague indeed, when critically examined:

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|--|---|
| <p>1. <i>Head</i> rough-haired or almost entirely smooth-scaled.</p> <p>2. <i>Tongue</i> and <i>maxillary palpi</i> rudimentary.</p> <p>3. Labial palpi strongly developed, porrect and more or less ascending; second joint with a brush, more or less developed, or simply thickened with scales beneath; terminal joint pointed, erect, or rarely obtuse and depressed.</p> <p>4. Vein 7 of fore wing to costa or rarely to apex.</p> <p>5. Vein 1<i>b</i> furcate at base.</p> <p>6. Hind wings as wide as fore wings.</p> <p>7. Vein 1<i>b</i> more or less distinctly furcate at base.</p> <p>8. Vein 1<i>e</i> always distinct.</p> | <p>1. <i>Head</i> entirely rough-haired.</p> <p>2. Maxillary palpi well developed, very rarely rudimentary. (Tongue not mentioned.)</p> <p>3. (Labial palpi not mentioned.)</p> <p>4. Vein 7 of fore wing to costa.</p> <p>5. (Vein 1<i>b</i> not mentioned.)</p> <p>6. (Width of wings not mentioned.)</p> <p>7. Vein 1<i>b</i> simple at base (except <i>Brackenridgia</i>).</p> <p>8. Vein 1<i>e</i> often absent.</p> |
|--|---|

In other words, he separates the two subfamilies "on one character apparently overlooked" (sic!), namely, the furcation of vein 1*b* of the

2. Trans. Ent. Soc. Lond., p. 81, 1891.

hind wings, which he himself admits occurs in one genus of *Tineina* (*Brackenridgia*),³ and which I find also in *Greya* and in *Cyane*, which belong to *Tineina*, according to Dietz.

In his first group Dr. Dietz places nine genera, of which, however, his genus *Semiota* is established on the male forms of Zeller's genus, *Setomorpha*, as shown by the writer,⁴ and his genus *Apotomia* is likewise (Dietz concurring) only the male form of *Setomorpha*; both must consequently fall as synonyms of Zeller's genus.

This leaves seven genera, of which the first three, *Amydria*, *Hypoplesia*⁵ (*Paraplesia*, Dietz, preoccupied) and *Paraneura* form one group (the *Euplacaminae* of Walsingham), in which the two last genera, *Epicheta* and *Aprata*, probably should be included,⁶ while the two remaining *Epilegis* and *Setomorpha* form another group (the *Setomorphine* of Walsingham).

Coming down to the species, I believe, from my examination of the too scant type material, that *Amydria curvistrigella*, *pandurella* and *confusella* are only slight variations of *apachella*, and should go into the synonymy.⁷ The species described as *Setomorpha sigmoidella* is not a true *Setomorpha*, but may be retained in that genus until more material is on hand; it will form a new genus. *Setomorpha majorella* is a good female *Setomorpha* species, and evidently (Dietz concurring) the same as *Semiota transversostrigella*, described from the male; the latter name will thus fall as a synonym.

In the second subfamily *Tineina*, Dr. Dietz includes twenty-two genera, of which six are new; all will probably prove valid.⁸ Much credit is due Dr. Dietz for bringing order out of the chaos in which our American species of this group were found.

I am able to make the following corrections and additions:

In *Xylesthia* Dr. Dietz has rightly adopted my conclusion⁹ that the three names given by Clemens, Zeller and Chambers all apply to the same

3. *Paraclemensia*, Busck, Journ. N. Y. Ent. Soc., XII, No. 3, 1904.

4. Proc. U. S. N. Mus., Vol. 30, p. 734, 1906.

5. Proc. U. S. N. Mus., Vol. 30, p. 735, 1906.

6. The material at present available is too scant to express absolute opinions on.

7. Dr. Dietz does not think so.

8. I have not yet, however, had opportunity to critically compare the new genera with existing exotic genera.

9. Proc. Wash. Ent. Soc., 5, p. 186, 1903.

species in various conditions of imperfection, but he nevertheless makes a fourth name for what is in my opinion undoubtedly¹⁰ the same insect in another degree of imperfection, and calls it "very distinct"; his *Kearfottella* is nothing but *pruniramiella*, Clemens.

Abacobia carbonella, Dietz, is the species described by Walker as *Tinea Martinella*, as my examination of Walker's type in the British Museum proved, and this very interesting form, which has a wide distribution, should be known as *Dietzia Martinella*, Walker, Dr. Dietz's generic name being preoccupied.¹¹ *Tinea afflictella*, Walker, is the female of this same species, as the unique type in the British Museum shows.

The present American conception of the genus *Incurvaria*, as expressed in our list and in Dr. Dietz's paper, is not equivalent to the European conception as defined by Meyrick,¹² but is rather *Lampronia*, Stephens; much more abundant material than at present at our command is required to properly straighten out this group.

Incurvaria rheumapterella, Dietz, is the well-known *Prodoxus coloradensis*, Riley, as is at once evident from Dietz's figure alone, and examination of the type verifies this.

Brackenridgia, Busck, should be *Paraclementia*, Busck.¹³

The venation of the hind wing of the genus *Isocorypha* is wrongly given, both in the text and in the figure; the hind wing is quite normal, and has eight veins all separate, vein 8 *not* connected with the cell.

In describing his new species, *crysocomella*, and in including it in this genus, Dr. Dietz has been inexplicably careless; the species has but the most superficial resemblance to the type-species, and does not even belong to the same family, but is an *Ethmia*, and the same as the species described by Lord Walsingham as *albitrigella*; Dr. Dietz's type is in very poor condition, but amply proves the synonymy.

The preoccupied name *Progona* has been substituted by *Mea*, Busck.¹⁴

Tinea costitristrigella, Chambers, seems to be omitted altogether.

10. Dr. Dietz not concurring.

11. Busck, Proc. U. S. N. Mus., Vol. 30, p. 735, 1906.

12. Handbook Br. Lep., p. 779, 1895.

13. Journ. N. Y. Ent. Soc., Vol. XII, No. 3, 1904.

14. Proc. U. S. N. Mus., Vol. 30, p. 735, 1906.

POPULAR AND PRACTICAL ENTOMOLOGY.—NO. 17.

THE LOCUST MITE.

BY T. D. JARVIS, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

During the past summer the Locust Mite (*Trombidium locustarum*, Riley) has been very common at Guelph, especially on the Red-legged Locust (*Melanoplus femur rubrum*), but a few specimens have also been found upon the Two-striped Locust (*Melanoplus bivittatus*). The mite is most generally found attached to the base of the second pair of wings, although it is also found on the wing itself, and on any other part of the body where it cannot be readily detached by the locust; a favourite position upon the body is between the segments of the thorax and abdomen, and also behind the upper joints of the legs; in such position their only means of attachment to their host is apparently by their mandibles.

The young mites (fig. 46, *b*) are nearly spherical, and look very much like the eggs of insects. The mite sucks the blood of its host until it

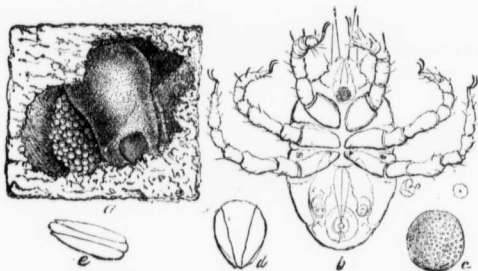


FIG. 46.—*TROMBIDIUM LOCUSTARUM*.—(a) female with her batch of eggs; (b) newly-hatched larva—natural size shown by the dot in a circle on the right; (c) egg; (d, e) empty egg-shells (after Riley).

reaches maturity, during which time it often becomes so swollen with food that its legs are rendered very inconspicuous. As many as five of these young larvæ have been found upon a single locust.

October, 1906.

The adult mite (fig. 47, *c, d*) is of a bright crimson colour and about one-eighteenth of an inch long. When full-grown it passes to the ground,

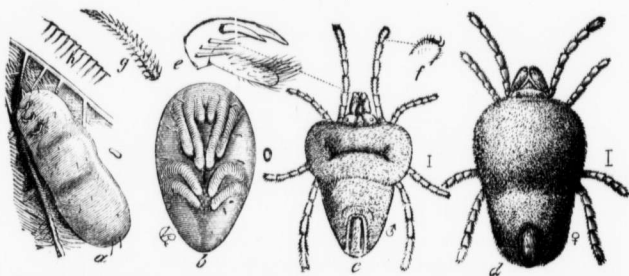


FIG. 47.—*TROMBIDIUM LOCUSTARUM*.—(*a*) mature larva, when about to leave the wing of a locust; (*b*) pupa; (*c*) male adult fresh from the pupa; (*d*) female—the natural sizes are indicated by the short lines on the right; (*e*) palpal claw and thumb; (*f*) pedal claws; (*g*) a barbed hair; (*h*) the striations on larval skin (after Riley).

where it remains over winter. Dr. Riley, who has studied the life-history of this mite, states that the eggs are laid an inch or so under the ground in clusters containing between 200 and 400. Early in the spring from these eggs emerge the young mites, which, upon reaching the surface of the ground, attach themselves to their hosts. These little mites render good service in checking the spread of the locusts, as almost every locust upon which one is found appears to be more feeble and sickly than those which have not been attacked.

THE ANNUAL MEETING of the Entomological Society of Ontario will be held at the Agricultural College, Guelph, on Wednesday and Thursday, the 10th and 11th of October. Mr. W. D. Kearfott, of Montclair, N. J., is expected to be present, as well as other members from a distance.

CHANGE OF ADDRESS.

All correspondence, books, exchanges, etc., for the Entomological Society of Ontario or the CANADIAN ENTOMOLOGIST, should in future be addressed to

GUELPH, ONTARIO, CANADA,

and not, as heretofore, to London, Ontario.

DESCRIPTION OF A NEW SPECIES OF SAW-FLY.

BY WARREN T. CLARKE, AUBURN, ALABAMA.

Dolerus Cookei, n. sp.—Female.—Length, 4 to 4.5 mm. Expanse of wings from tip to tip, 8 to 9 mm. General colour effect of body dark brown to black. Head back of, about and beneath ocelli, black, sparsely clothed with whitish hairs. Clypeus sinuate, incurved, yellow, sparsely pilose. Labrum polished yellow. Antennæ dark brown to black, stout, pilose. Joints i and ii subequal, short; rest subequal, longer. Antennal foveæ circular, deep. Thorax: tergum black, sparsely clothed with whitish hairs; pleura and venter polished black. Wings smoky brown; first submarginal cell irregular oblong; veins dark brown to black. No clear spot at base of wings. Legs yellow, shading to brown; tibial spur not bifid, yellow. Abdomen stout, black, sparsely pilose. Saw yellowish, marked with dark brown, sheath black.

Male.—Length, 3 to 3.5 mm. Expanse of wings from tip to tip, 7 to 7.5 mm. General colour effect of body yellow. Head back of, about and beneath ocelli, polished yellow, sparsely clothed with white hairs. Clypeus sinuate, incurved, yellow, slightly pilose. Labrum polished yellow. Antennæ stout, yellow, joints i and ii subequal, short; rest subequal, longer. Antennal foveæ circular, deep. Thorax: tergum dark brown, clothed with white hairs. Pleura and venter polished yellow. Wings hyaline, veins yellow-brown. First submarginal cell irregular oblong; no clear spot at base of wing. Legs yellow; tibial spur not bifid, yellow. Abdomen medium slender. Tergum and pleura dark brown, marked with yellow; venter yellow; all slightly pilose.

Habitat, California.

The sexes are readily separable by the colour and size dimorphism shown in the species. The insects are single-brooded, the eggs being placed in the tissue of the calyx ring or sheath of the cherry and plum blossom, just beneath the outer epidermis. Incubation is accomplished in from five to seven days, the young larvæ boring into the newly forming fruit and devouring the embryo. The larvæ attain their full growth in from 21 to 25 days, being then about seven millimeters in length. They then pass down to and into the ground beneath the trees, there forming small cells, in which pupation takes place later on. In the following spring the adult insect appears, and the cycle is completed.

This species can be distinguished from the other species of *Dolerus* known in California by the following table:

October, 1906.

More than 9 mm. in length.

Clypeus notched. *coccinifera*.
 Clypeus sinuate. *Tejonensis*.

Less than 9 mm. in length.

Head and thorax coarsely punctured or pitted. *distinctus*.

Head and thorax not coarsely punctured or pitted. *Cookei*.

This insect (*D. Cookei*) was first noted in the larval form about the year 1883 by the late Matthew Cooke, then Chief Executive Horticultural officer of the State of California. Specimens of the larvæ were determined by him to belong to the family Tenthredinidæ. Cooke's work with the insect in question went no further than this, no adults being examined by him (see "Injurious Insects of the Vineyard, Orchard, etc.," pp. 137-138, Sacramento, 1883). During the spring and early summer of the years 1905 and 1906 it became the writer's duty to make a field study of this insect in the Suisun valley, California, and this paper records certain of the observations then made.

BOOK NOTICE.

"BOULDER REVERIES."—By W. S. Blatchley. The Nature Publishing Co., Indianapolis.

This volume is made up of extracts from the diary of one who is in sympathy with nature as she reveals herself by the wayside, in neglected wood-lots, in purling stream, on the rugged hillside, or by the desolate lake shore. The environment peculiar to these places in the summer and autumn seasons envelops the reader as his mind meanders leisurely over its pages. The book does not call for ardent study, but simply for an occasional perusal at times when the mind is jaded by the common cares of life, and when it is impossible for one to get out with nature herself in order to realize at first hand the refreshing influence of her perennially soothing, strengthening and uplifting powers. No stirring flights of the imagination are provided, but nature as she is seen by the appreciative observer of insect, plant and animal life, of sunshine bright, and cooling showers, is presented to the mind's eye by one who could never be lonesome in lonely places.

"Aug. 17, 1902.—How beautiful the green livery of nature in the country on these mid-August days! The many rains of the season have enhanced the depth of that green, have clothed the face of the earth in her most luxuriant garb. Peace, calm, quietude; here, if anywhere, they reign! Not even the droning of a bumblebee breaks the quiet of the Sabbath morn." This is a typical paragraph from the "Reveries."

D. H. J.